Gerontha peterseni sp. nov. - a new species from Papua New Guinea (Lepidoptera: Tineidae) found in material of the "Kaiserin Augusta-Fluß-Expedition"

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Abstract: This paper is a first result of the study of Microlepidoptera collected by the Kaiserin Augusta-Fluß-Expedition in 1912-13. A short account introduces the expedition. The genus *Gerontha* Walker, 1864 contains 24 species including the herein described species *G. peterseni* sp. nov. The male genitalia are illustrated and compared with the genitalia of *G. acrosthenia* Zaguljaev, 1972, which occurs sympatrically with the new species in Papua-New Guinea. A list of all species of the genus is provided.

Key words: Insecta, Lepidoptera, Tineidae, *Gerontha peterseni* sp. nov., Papua New Guinea, Kaiserin Augusta-Fluß-Expedition.

Introduction

The northern part of Papua-New Guinea was a German colonial territory from 1884 to 1915. During this short period of time the scientific explorations of the islands natural history was intensively promoted and ensured by the German Government. Besides activities of private collectors and ventures of individual scientists the exploration of the country was closely connected with a series of smaller and larger expeditions that were conducted to investigate the islands off the northern and eastern coast, the coastal areas and the interior of New Guinea. The last, but probably the most important expedition was undertaken from 1912-1913. It was organised by "Kaiserliches Colonial Amt" (= Imperial Office for the colonies) in Berlin and became known as the "Kaiserin Augusta-Fluß-Expedition". The target area was the Sepik (= Kaiserin Augusta Fluß) and its extensive catchment area. The expedition used a specially reconstructed river boat and advanced to the foothills of the central mountain ranges to the points where the rivers became unnavigable. Initial results of the expedition were published by Stollé (1914) and Behrmann (1917), who also wrote a narrative of the expedition five years later (Behrmann 1922). He was the geographer of the expedition and provided a detailed account of the topography, geology, watershed, and climate in the researched area, and reported on the economic situation of the indigenous people. The report did not include any data on botany, zoology, anthropology and ethnology. Results from these disciplines were published separately by members of the expedition and their co-workers (e.g. Roesicke 1914). Dr. J. Bürgers was the medical doctor and zoologist of the expedition. He collected a wide spectrum of invertebrates and vertebrates and took care of its proper preservation and safe transport. The material was sent to the Zoological Museum Berlin, where it was prepared, labelled and sorted to groups. The scientific study of the material began shortly afterwards and was carried out by group experts. Monographic treatments were produced for e.g. Phasmatodea (Günther 1929), Dermaptera (Günther 1930), Orthoptera (Günther 1938), Aves (Stresemann 1923) and Reptilia (Vogt 1932). More often, and now eventually as the typical mode, the results were published not in monographic treatments of the material of the expedition, but rather as included parts of revisions, catalogues, biogeographic and taxonomic articles (e.g. Ulmer 1915, 1938). These have appeared in a variety of journals after World War I, and even 100 years after the expedition new species descriptions have been published based on expedition material (e.g. Mey 2006, and the present article). Today, the scattered literature makes it difficult or impossible to get an idea of the zoological achievements

of the expedition in general. Its significance is clearly documented in the fields of geography and ethnology, but not in zoology and also not in botany. The causes for this discrepancy are still obscure but they are probably connected with the outbreak of World War I, which led to a deep change in the organisation and structures of scientific institutions in Germany. We do not know about the intentions and plans of J. Bürgers after his return to Germany. He did not publish on the expedition, nor was he in contact with scientists of the Berlin museum, where all his material was deposited. His fate remains obscure until today.

The expedition did not collect only the insect groups mentioned above. The book of entries of the Lepidoptera section of the museum contains several inscriptions about the receipt of butterflies and moths collected and provided by Dr. Bürgers from 1912-1914. With a total of more than 6000 specimens it is an important and rich collection of Lepidoptera from north-eastern New Guinea. The material was received in samples of dried specimens carefully packed in paper envelopes of different sizes. By 1915 the material was completely set and labelled. The butterflies and larger moths were made available to experts who studied and sorted the species into the systematic collection. In contrast, the material encompassing the Microlepidoptera was transferred to the cabinets where accessions are deposited. Here, the drawers remained nearly untouched for the next 90 years.

A hundred years have elapsed since the end of the expedition. The collection of Lepidoptera was made at a time when New Guinea was in its original state. The natural environment was unspoiled and the aquatic and terrestrial ecosystems complete and intact. In the subsequent years, the catchment area of the Sepik has been gradually altered. The original environment was transformed in many places to meet the needs of a growing population and developing civilisation. The Lepidoptera of the Kaiserin Augusta-Fluß-Expedition is thus a window into the past. It is a reflection of the entomofauna of an intact environment at a time from where we have only scattered and scanty information.

The author decided to embark on a study of the material of the expedition. The present article provides not only a first, small result but is also an announcement of the existence of this material and an invitation for interested lepidopterists to participate.

Taxonomy

Tineidae: Myrmecozelinae

Gerontha Walker, 1864

Type species by monotypy: *G. captiosella* Walker, 1864: 782.

An exhaustive description of the genus was provided by Robinson & Nielsen (1993). To date, a total of 24 species are included in the genus (see Table 1).

Species of *Gerontha* Walker, 1864 are remarkable and easy to recognise Tineid moths. They are large insects with conspicuously long hindlegs. Because the moths are frequently attracted to light they are readily observed, collected and identified by most microlepidopterists.

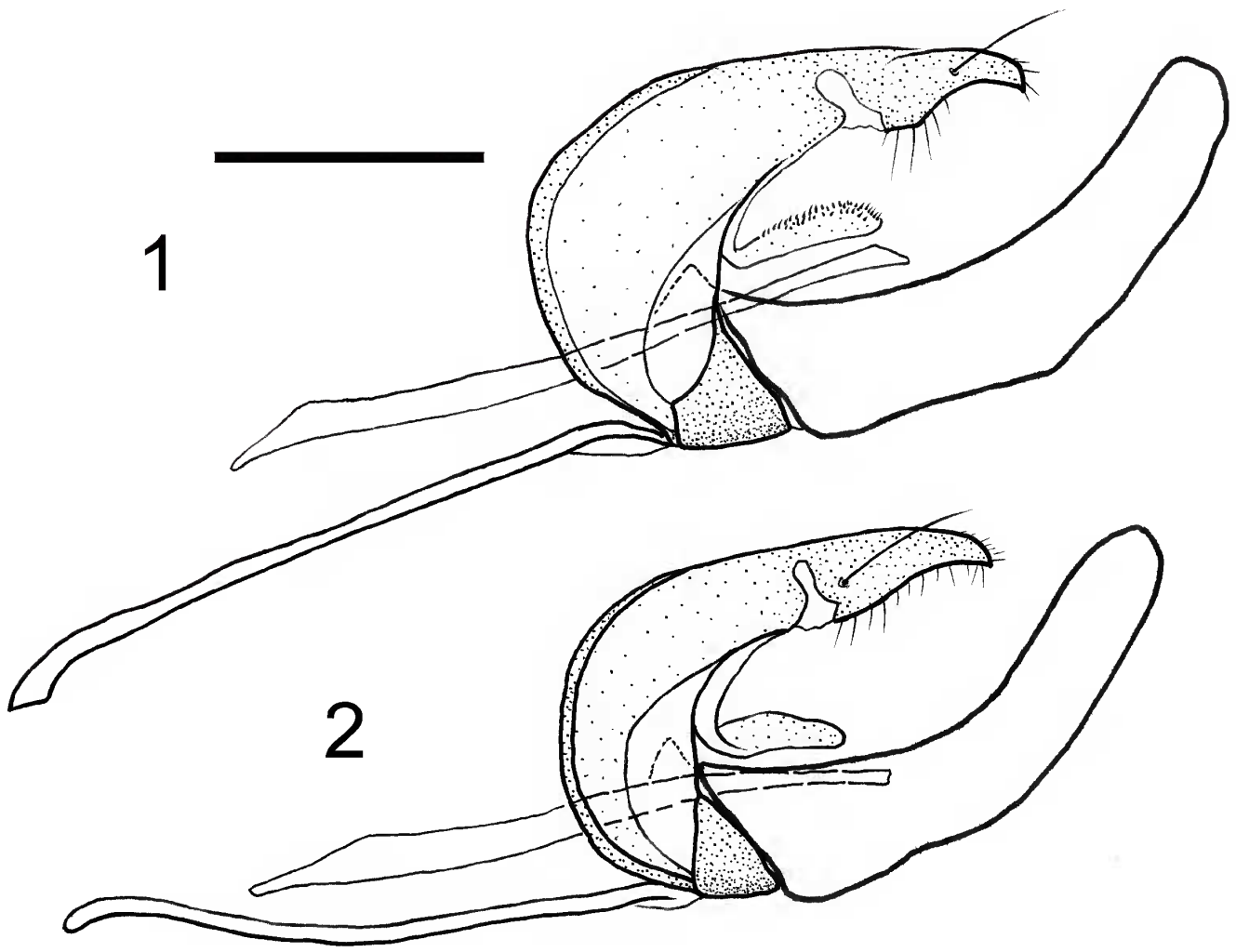
At the species level the correct identification is more difficult. According to Robinson (2009) the majority of species cannot be differentiated by external characters, even by comparing long series. Genitalia preparations are thus indispensable. The male genitalia differ in the shape of uncus, gnathos and valva. These characters provide sufficient information for the establishment of species groups. This should be done when more species are added to the genus in the future and when the unknown males of four species become known. The female genitalia are very similar to each other and exhibit only few features, which can be used for separating species. They can be found in the sterigmal area around the genital opening on the ventral side of sternum VIII.

The genus has a typical Australasian distribution (cf. Mey 2001), with extensions to the eastern Palaearctic region and to Polynesia. The taxonomic diversity is highest in the Oriental region which points to an oriental origin of this group and a subsequent colonisation of the Malesian Archipelago beyond the Sunda Shelf towards Australia.

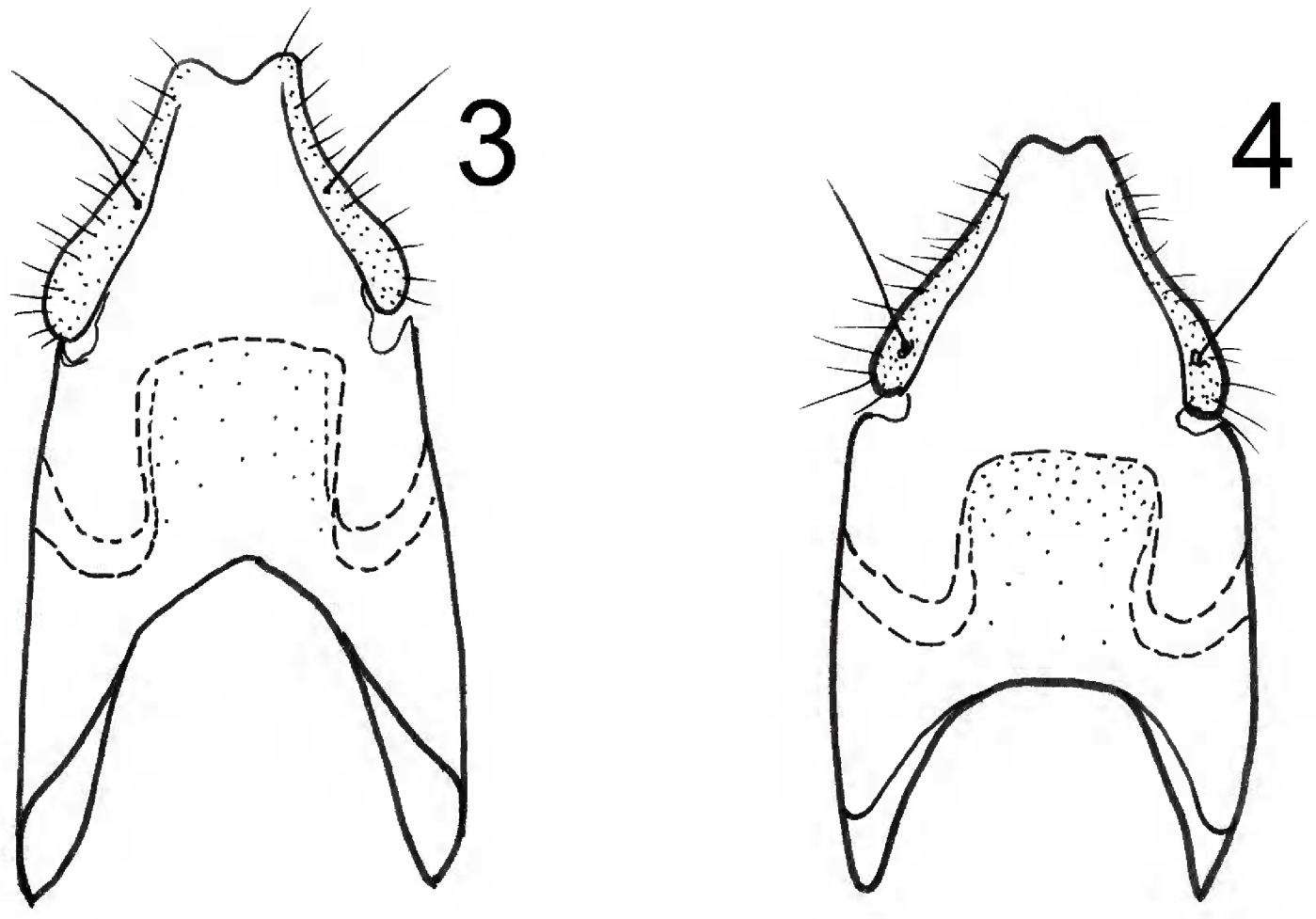
***Gerontha acrosthenia* Zagulajev, 1972** (Figs 1, 3, 5, 8)

Material: 1♂, 1♀ MFN, D.N. Guinea 1913/ Hauptl[a] g[er]. b[ei]. Malu 1.III.1913/ Kais[erin]. Augustafl[uss]. Exp[etition] / Bürgers S. G., 4869 and 4863, genitalia slide Mey 11/13.

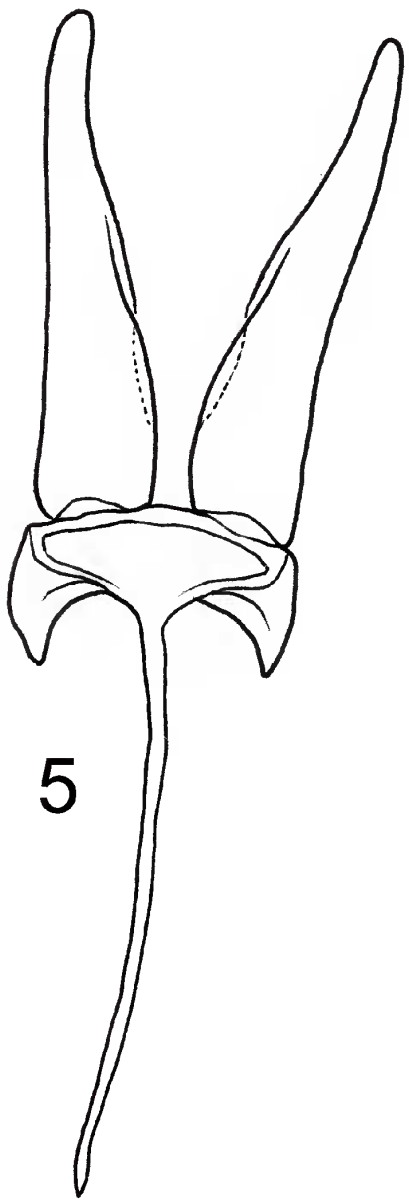
Note: This is the first record of the species from Papua New Guinea. It was expected to occur here since it was discovered in northern Australia too (Robinson, Nielsen 1993). For general distribution of this species see Table 1.

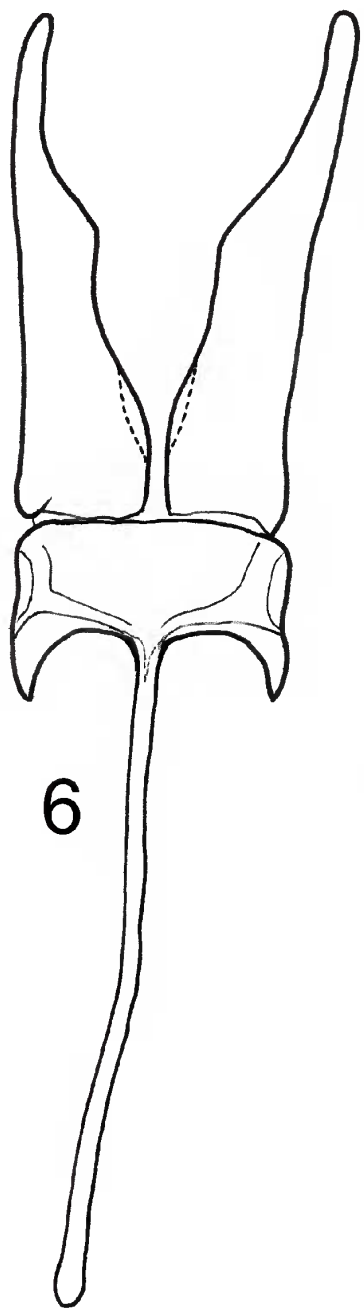


Figures 1-2. Male genitalia of *Gerontha* species, lateral view. 1 – *G. acrosthenia* Zagulajev, 1972; 2 – *G. peterseni* sp. nov., holotype, genitalia slide Mey 12/13.



Figures 3-4. Male genitalia of *Gerontha* species, dorsal view. 1 – *G. acrosthenia* Zagulajev, 1972; 2 – *G. peterseni* sp. nov., holotype, genitalia slide Mey 12/13.





Figures 5-6. Male genitalia of *Gerontha* species, ventral view. 1 – *G. acrosthenia* Zagulajev, 1972; 2 – *G. peterseni* sp. nov., holotype, genitalia slide Mey 12/13.

***Gerontha peterseni* sp. nov.** (Figs 2, 4, 6, plate 36 fig. 1, map 1)

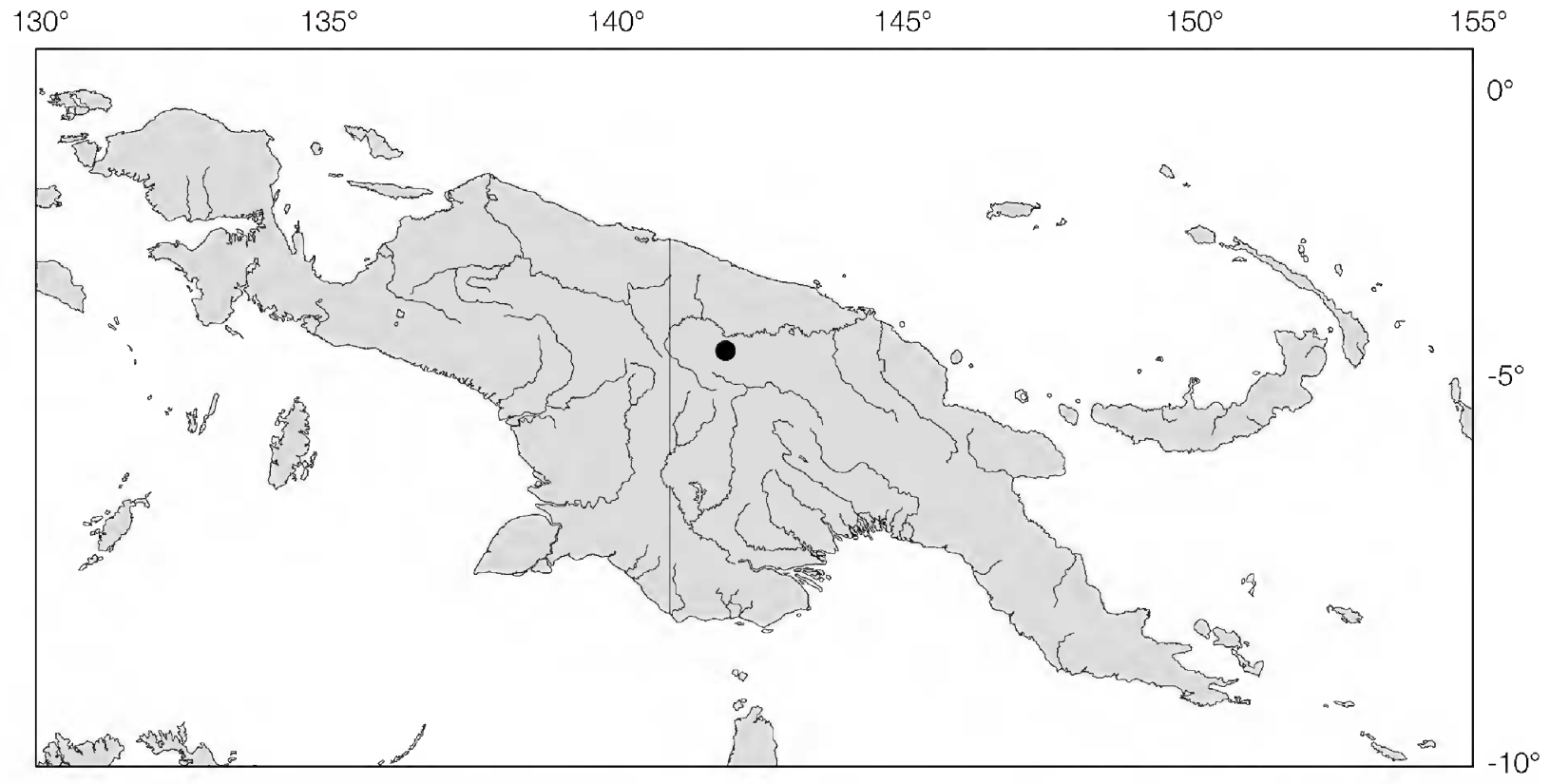
Holotype ♂ MFN: D.N. Guinea IV 1912/ Standlager b[ei]. Malu / Kaiserin Augustafl[uss]. Exp[etition] / Bürgers S. G.“, genitalia slide Mey 12/13.

Paratype 1♂ MFN: D.N. Guinea 1913/ Hauptl[a]g[er]. b[ei]. Malu I-II. / Kais[erin]. Augustafl[uss]. Exp[etition]/ Bürgers S. G., 768/69.

Derivatio nominis: Patronymic. The new species is named in memory of Günter Petersen, famous specialist of Tineidae and kind colleague who passed away in 2012.

Description: Length of forewing 8.5-9 mm, wing span 13-15 mm; vestiture of frons and vertex grey-brown; proboscis well developed, galeae not dissociated, in apical part with small, lateral villi; labial palps ascending, second segment longest, with appressed dark brown scales on lateral sides and long, black piliform scales on ventral side; maxillary palps short, folded over base of proboscis; scape with appressed, grey-brown scales, pecten absent, flagellomeres thick, each with complete annulus of scales and a basal whorl of long, bent ciliae; fore- and middle tibia with a brush of black hairs on dorsal side, tarsus of fore and middle legs white, of hindlegs brown, tarsal segments with apical spines; forewings pale brown, with scattered darker flecks and some patches of larger, semi-erect scales, R4 and R5 with a long stalk; media in cell absent, anal veins with short basal loop; hindwings with two frenular bristles, wing membrane in the centre translucent, towards wing margin covered with small brown scales, fringe long and brown; media in cell complete, M1 and M2 with short stalk, A1 and A2 with a basal loop, A1+2 curved and forming a large anal field. Male genitalia (Figs 2, 4, 6): Vinculum short, triangular in lateral view, nearly rectangular in ventral view, saccus as long as valvae; apex of uncus shortly bilobed, curved somewhat ventrad, lateral sides hairy, with a long bristle close to the base; gnathos broad, plate-like; basal apophyses of valvae short, without processes and without sclerotised transtilla; valvae ribbon-like, curved dorsad, aedeagus a long, slender tube, without cornuti.

Remarks: While sorting micromoths of the material of the Kaiserin Augusta-Fluß-Expedition I found two species of *Gerontha*: one of normal size and the other conspicuously smaller. A closer examination of the genitalia confirmed the presence of two distinct species, which occur sympatrically near the base camp of the expedition (Fig. 9). The larger one was identified as *G. acrosthena* Zaguljaev and the smaller one turned out to be undescribed. Both species, though differing clearly in size, have very similar genitalia. They can be distinguished by the form of the valvae and the breath of the gnathos in dorsal view. In addition, the long bristle on the lateral side of the uncus complex of the new species emerges in the middle, whereas in *G. peterseni* sp. nov. the origin of this bristle is close to the base. Both species are closely related. Its synapomorphy is the plate-like gnathos, which separates this species pair from all other members of *Gerontha*, where the gnathos is usually elongate and triangular.



Map 1. Map of New Guinea showing the locality of the main camp of the Kaiserin Augusta-Fluß expedition and the locus typicus of *Gerontha peterseni* sp. nov.

Table 1. List of hitherto described species of *Gerontha* Walker, 1864.

Species (arranged alphabetically)	**Distribution**
G. acrosthenia Zagulajev, 1972,	Indonesia: Papua; Australia; Papua New Guinea
G. albidicomans Moriuti, 1989 [1]	Malaysia: Sabah
G. amplitera Ponomarenko, Park, 1996	Korean Peninsula
G. akahatii Moriuti, 1989	Japan: Ryukyu Islands
G. borea Moriuti, 1977	Japan; Korean Peninsula
G. captiosella Walker, 1864	Sri Lanka
G. diascopa Diakonoff, 1967 [2]	The Philippines: [islands]; Malaysia: Sabah
G. dolichophallica Moriuti, 1989	Indonesia: Sulawesi
G. dracuncula Meyrick, 1928	Andaman Islands
= *G. siroii* Moriuti, 1989 [synonymised by Robinson & Tuck 1996]	Thailand
G. flexura Huang, Hirowatari, Wang, 2006	China: Hainan Island
G. hoenei Petersen, 1987	China: Yunnan
G. hyalina Moriuti, 1989	Malaysia: Sabah
G. melanopalpalis Moriuti, 1989 [3]	Indonesia: Sulawesi
G. monostigma Diakonoff, 1967	The Philippines: Mindanao
G. namhaensis Ponomarenko, Park, 1996	Korean Peninsula
G. navapuriensis Moriuti, 1989	Thailand
G. nivicaput Diakonoff, 1967	The Philippines: Luzon & Mindanao
G. opaca Moriuti, 1989	Indonesia: Sulawesi
G. peterseni sp. nov.	Papua New Guinea
G. siamensis Moriuti, 1989	Thailand
G. stheacra Zagulajev, 19721	Indonesia: Sumatra
G. sumihiroi Moriuti, 1989	Thailand; West Malaysia
G. thailandiae Moriuti, 1989	Thailand
G. tudai Moriuti, 1989	Thailand

1, 2 & 3 – These species are known from female specimens only.

References

Behrmann W. 1917. Der Sepik (Kaiserin-Augusta-Fluß) und sein Stromgebiet. – *Mitteilungen aus den deutschen Schutzgebieten, Ergänzungsheft* **12**: 100 pp.

Behrmann W. 1922. *Im Stromgebiet des Sepik. Eine deutsche Forschungsreise in Neuguinea*. Berlin, August Scherl GmbH: 359 pp.

Diakonoff A. 1967. Microlepidoptera of the Philippine Islands. – *Bulletin of the Smithsonian Institution* **257**: 484 pp.

Günther K. 1929. Die Phasmoiden der Deutschen Kaiserin Augusta-Fluß-Expedition 1912/13, ein Beitrag zur Kenntnis der Phasmoidenfauna Neuguineas. – *Mitteilungen aus dem zoologischen Museum Berlin* **14**: 739-810.

Günther K. 1930. Die Dermapteren der Deutschen Kaiserin Augusta-Fluß-Expedition 1912/13. – *Mitteilungen aus dem zoologischen Museum Berlin* **15**: 53-83.

Günther K. 1938. Acrydiinen (Orthoptera, Acrididae) von Neu Guinea. – *Nova Guinea: A Journal of Botany, Zoology, Anthropology, Ethnography, Geology and Palaeontology of the Papuan Region, new series* **2**: 1-46.

Huang G.-H., Hirowatari T., Wang M. 2006. A new *Gerontha* Walker (Lepidoptera, Tineidae) from Hainan, China. – *Transactions of the Lepidopterological Society of Japan* **57**, No. 2: 132-136.

Mey W. 2001. Australasian distribution in Trichoptera (Insecta) – a frequent pattern or a rare case? 255-268. In: Metcalf I., Smith J.M.B., Morwood M., Davidson I. (eds) *Faunal and floral migrations and evolution in SE Asia–Australasia*. Lisse, Balkema Publishers: 416 pp.

Mey W. 2006. *Chimarra guentheri* sp. nov. – a new species from New Guinea (Insecta, Trichoptera). – *Mitteilungen aus dem Museum für Naturkunde Berlin, Zoologische Reihe* **82**, No. 2: 261-263.

Moriuti S. 1989a. Eleven new species of *Gerontha* from Southeast Asia, with notes on others (Lepidoptera: Tineidae). – *Microlepidoptera of Thailand* **2**: 87-112.

Moriuti S. 1989b. A new *Gerontha* (Lepidoptera: Tineidae) from Japan. – *Nota lepidopterologica* **12**, No. 3: 179-182.

Petersen G. 1987. A new *Gerontha* from China (Tineidae). – *Tinea* **12**, Supplement: 152-154.

Ponomarenko M., Park K.T. 1996. Notes on some Tineids from Korea and Russian Far East, with descriptions of four new species (Lepidoptera: Tineidae). – *Korean Journal of Applied Entomology* **35**, No. 4: 273-279.

Robinson G.S. 2009. *Biology, distribution and diversity of Tineid moths*. Kuala Lumpur, Southdene Sdn Bhd.: 143 pp. + 16 pls.

Robinson G.S., Nielsen E.S. 1993. Tineid genera of Australia (Lepidoptera). *Monographs on Australian Lepidoptera*. Volume **2**. Canberra, CSIRO: XVI + 344 pp.

Robinson G.S., Tuck K.R. 1996. A revisionary checklist of the Tineidae (Lepidoptera) of the Oriental region. *Occasional Papers on Systematic Entomology* **9**: 1-29.

Roesicke A. 1914. Mitteilungen über ethnographische Ergebnisse der Kaiserin Augusta-Fluß-Expedition. – *Zeitschrift für Ethnologie, Berlin* **46**: 507-522.

Stollé A. 1914. Überblick über den Verlauf der Kaiserin Augusta-Fluß-Expedition. – *Zeitschrift der Gesellschaft für Erdkunde, Berlin* **4**: 249.

Stresemann E. 1923. Dr. Bürgers`ornithologische Ausbeute im Stromgebiet des Sepik. Ein Beitrag zur Kenntnis der Vogelwelt Neuguineas. – *Archiv für Naturgeschichte, Abteilung A,* **89**, No. 7/8: 1-92.

Ulmer G. 1915. Trichopteren des Ostens, besonders von Ceylon und Neu-Guinea. – *Deutsche entomologische Zeitschrift* **1915**: 41-75.

Ulmer G. 1938. Einige neue Trichopteren von Neu-Guinea aus dem Berliner Museum. – *Sitzungsberichte der Gesellschaft naturforschender Freunde zu Berlin* **1938**: 398-403.

Vogt T. 1932. Beitrag zur Reptilienfauna der ehemaligen Kolonie Deutsch-Neuguinea. – *Sitzungsberichte der Gesellschaft naturforschender Freunde zu Berlin* **1932**, No. 5/7: 281-294.

Walker F. 1864. *List of the specimens of lepidopterous insects in the collection of the British Museum* 29. London, Tineites. Newman: 563-835.

Zagulajev A.K. 1972. New and little known species of Tineidae, Deuterotineidae, Ochsenheimeriidae (Lepidoptera). – *Proceedings of the Zoological Institute Leningrad* **52**: 332-356 [in Russian].

Figures 1-2. Habitus of Papuan *Gerontha* species. 1 – *G. peterseni* sp. nov., ♂ holotype; 2 – *Gerontha acrosthenia* Zagulajev, 1972, ♂ from Malu surroundings, Papua New Guinea.